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Poultry Vaccines and Vaccination Practices among Farmers in Wukari, Taraba State Nigeria

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ABSTRACT

Poultry enterprise is increasingly gaining viability owning to successful preventive measures of vaccination protocols for various diseases of economic importance. A cross-sectional study involving forty-five (45) poultry farms across the Six (6) wards in Wukari, Local Government Area, Taraba State Nigeria; were surveyed to determine the vaccination practices and the vaccines used by poultry farmers. Purposive sampling was employed by Interviewer administered structured questionnaires in the course of the study. Fisher's exact test was used to test for association between categorical variables. A total of 8 (17.8%), 3 (6.7%), 3 (6.7%), 8 (17.8%), 6 (13.3%) and 17 (37.8%) farms were visited in Avyi, Bantaje, Chonku, Hospital, Jibu and Puje wards respectively. The forty-five respondents were 57.8% male and 42.2% female farmers. Majority of the respondents never administered Marek's (82.2%), LaSota (51.1%), Komarov (75.6%), Fowl cholera (75.6%) Fowl typhoid (73.3%) and Coccidiosis (68.9%) vaccines. Only 42.2% of the respondents had vaccination records while 51.1% had vaccination schedules. There was a significant association between disease outbreak and the use of Infectious Bursal disease, Fowl typhoid, Fowlpox and Coccidiosis vaccines respectively. The association between the handling of vaccines and disease outbreaks were significant ($p<0.05$) for Marek's, Infectious Bursal disease, Fowl typhoid and Coccidiosis. The result of the association between vaccine administration against vaccine failures was significantly different ($p<0.05$) in all vaccines used. In conclusion, poultry farmers in Wukari are aware of routine vaccinations although a majority of them do not administer the vaccines and the few that use these vaccines have poor record/storage practices.

KEYWORDS: *Outbreak; Poultry; Vaccines; and Wukari*

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1. INTRODUCTION

Vaccines are biological preparations that improve immunity to a particular disease. A vaccine typically contains an agent that resembles a disease-causing microorganism, and is often made from weakened or killed forms of the microbe, its toxins or one of its surface protein [1].

Poultry vaccines induce immune responses to the specific disease causing agents. Depending on the vaccine, they can be administered in various ways: also on the type of antigen in the vaccine, the birds' immune system will react, creating a "memory" response of antibodies and immune cells. The more a bird is exposed to the same antigen, the greater the antibody response and resulting protection. This is the reason many flocks are vaccinated multiple times for the same disease – to maximize the immune system's response Vaccines for poultry come in three general forms: Modified or Attenuated (Live), Inactivated (Killed), and Recombinants. Live vaccines are strains that are naturally or genetically modified milder forms of field strains. Inactivated vaccines are whole viruses or bacteria that have been inactivated during production and formulated into an inject able form. Recombinant vaccines are made by using live virus or bacteria as a vector to transport the gene coding for the protective antigen of a second infectious agent for which immunity is desired [2].

Vaccination is the administration of optimal and safe amount of attenuated antigens to stimulate immune response in the host against specific disease [3]. Vaccination is an effective means to prevent and/or reduce the adverse effects of specific diseases that can cause problems in a poultry flock [4].

Poultry farming is a lucrative venture in the livestock production, its success is attributed many factors: sources of animal protein needed in daily human diet, easy management, wide range of feeding materials (feed stuff) and recently biosecurity etc. According to Marangon and Busani, [5], poultry are kept as a source of animal protein throughout the world. They are able to adapt to most geographical areas and conditions, not expensive to buy; possess a short generation interval and a high rate of productivity, and do not require large areas of land. Local and modern farmers (farming local breeds of poultry and

rearing exotic breed) tap these benefits and convert them to gain irrespective of their level of production.

Despite excellent contribution and benefit of poultry farming to the livelihood of farmers, there exist some constraints that subvert optimum performance. Generally risk and uncertainty are major constraints affecting poultry production. Diseases and infections are major contributors of risk and uncertainty. In Nigeria, poultry diseases remain the greatest threat to the poultry industry and are responsible for very large economic loss to the farmers. Modern poultry farming has resulted in the development of high density poultry areas with increased risk of disease spread [3].

Diseases are ubiquitous, and where there are concentrations of commercial poultry their effects can be devastating. The primary strategy for controlling disease should be measures to prevent the disease from entering the premises. Prevention efforts must focus on new management systems, products and practices that help block entry of infectious disease and that improve the innate or inherent resistance of the bird. Vaccines can be the next line of defense when the diseases occasionally breach the premises due to failures in biosecurity. The effects of the disease can be minimized if the birds have immunity because of prior vaccination [6].

According to Butcher and Yegani [6], a well-designed vaccination program will not be effective if the vaccine is damaged by improper handling prior to administration. Live vaccines can be inactivated when exposed to adverse conditions. Store and handle vaccines as recommended by the manufacturer. Once a vaccine is reconstituted, the "time clock is ticking" for it to be used. Certain live vaccines, such as for Marek's Disease Vaccine, are extremely fragile and failure to follow the manufacturer's recommended handling practices will result in the inactivation of the virus prior to administration [7]. Infectious bronchitis virus vaccine is reported to lose approximately 50% of its potency in warm conditions less than one hour after reconstitution.

In WukariLocal Government, poultry production output is higher at the period festivity: during these periods the rate of poultry diseases tends to be higher also, especially during dry harmattan period of christmas. There are often cases of preventable poultry diseases at peak production period. It became necessary to find out whether or not these poultry were vaccinated, and make recommendation where necessary. The aim of this research is to investigate poultry vaccines and vaccination practices among farmers in Wukari Local Government area of Taraba State.

2. RESEARCH METHODOLOGY

2.1. Study Area

The study was conducted in Wukari Local Government Area. It is located between latitude 7˚51'N to 7˚85'N and longitude 9˚46'E to 9˚78'E of the Greenwich meridian. Wukari Local Government area is situated in the southern part of Taraba State. It is about two hundred kilometers away from Jalingo the state capital. The Local Government is bounded by Plateau State in the North, Benue State in the Southwest, Northeast by Karim Lamido, Bali, and Takum Local Government Area [8].

2.2. Sample Population

The sample population of this research comprises of commercial and local poultry farmers within Wukari Local Government Area.

2.3. Sample Size

A total of 45 farmers were sampled using structured questionnaires which were administered to poultry farmers by convenience sampling in six wards (Avyi, Bantaje, Chonkc, Hospital, Jibu and Puje) within Wukari.

2.4. Data Analysis

Data gathered from this research was subjected to descriptive analysis. The association between the categorical variables were analyzed using chi-square and values of $P<0.05$ where considered significant. The tool for statistical analysis was Statistical Package for Social Science (SPSS) model 16.0.

3. RESULT AND DISCUSSION,

3.1. Result

Table 1 Demographical Analysis of Poultry Farmers in Wukari Local Area

Item	Frequency (%)
Location of farmers	
Avyi	8 (17.8)
Bantaje	3 (6.7)
Chonku	3 (6.7)
Hospital	8 (17.8)
Jibu	6 (13.3)
Puje	13 (37.8)
Gender	
Male	26 (67.8)
Female	19 (42.2)
Ages (years)	
19-29	12(26.7)
30-39	18 (40.0)
40 and above	15 (33.3)
Profession	
Civil servant	18 (40.0)
Business men	22 (48.9)
Student	5 (11.1)
Educational background	
Informal	1 (2.2)
Primary	5 (11.1)
Secondary	8 (17.8)
Tertiary	31 (68.0)

Table 2 Association of use of vaccines and purpose of keeping birds among Farmers in Wukari Local Government area

Used of vaccines(n=45) purpose of keeping birds (n=45) chi-square p-value
Mareks Vaccines Commercial/ (%) Domestic/(%)
Yes 6 (16.2) 2 (25.0) 1.485 0.302 F
No 31 (83.3) 6 (75.0)
Intraocular NDV
Yes 26 (70.0) 1 (12.5) 9.147 0.004* F
No 11 (29.7) 7 (87.5)
Lasota NDV

Yes 20 (54.1) 4 (50.0) 0.043 0.295 F
No 17 (45.9) 4 (50.0)
Komorov NDV
Yes 10 (27.0) 2 (25.0) 0.014 0.399F
No 27 (73.0) 6 (75.0)
Gumboro Disease Vaccines
Yes 24 (64.9) 4 (50.0) 0.618 0.226F
No 13 (35.2) 4 (50.0)
Fowl cholera vaccines
Yes 9 (24.3) 3 (37.5) 0.584 0.242 F
No 28 (75.7) 5 (62.5).
Fowl Typhoid Vaccines
Yes 9 (24.3) 3 (37.5) 0.584 0.242 F
No 28 (75.7) 5 (62.5)
Fowl pox Vaccines
Yes 24 (64.9) 3 (37.5) 2.052 0.116F
No 13 (35.1) 5 (62.5)
Coccidiosis Vaccines
Yes 17 (45.9) 1 (12.5) 3.066 0.074 F
No 20 (54.1) 7 (87.5)
Egg DropSyndrome Vaccine
Yes 4 (10.8) 1 (12.5) 0.019 0.432 F
No 33 (89.2) 7 (87.5)

Key
F= Fisher's exact test
*= significant difference
**= highly significant

Table 3 Association of Use of Poultry Vaccines and Diseases Outbreak among Poultry Farmers in Wukari

Used of Vaccines(n=45) Diseases Oubtbreak/ (n=45) Chi-square p-values
Marek's Yes / (%) No/ (%)
Yes 2 (25.0) 6 (75.0) 5.256 0.077 F
No 36 (92.3) 1 (2.7)
Newcastle intraocular
Yes 20 (74.1) 7 (25.9) 2.732 0.098
No 9 (50.0) 9 (50.0)
Newcatlelasota
Yes 17 (70.8) 7 (29.2) 0.916 0.157 F
No 9 (42.9) 12 (57.1)
Newcastle komorov
Yes 10 (83.3) 2 (16.7) 2.548 0 .084 F
No 14 (42.4) 19 (57.6)
Gumboro
Yes 15 (53.6) 0 (0) 13.661 0 .000** F
No 13 (46.4) 17 (100)
Fowl-cholera
Yes 8 (66.7) 4 (33.3) 0.818 0 .186 F
No 16 (48.3) 17 (51.5)
Fowl Typhoid
Yes 10 (83.3) 2 (16.7) 16.302 0 .000** F
No 6 (18.2) 27 (81.8)
Fowl pox
Yes 21(77.8) 6 (22.2) 8.889 0 .003*
No 12 (66.70) 6 (33.3)
Coccidiosis
Yes 14 (77.8) 4 (22.2) 8.358 0.003* F
No 9 (33.3) 18 (66.7)
Egg drop syndrome
yes 2 (40) 3 (60) 14.792 0 .002* F
No 40 (100) 0 (0)

Key
F= Fisher's exact test
*= significant difference

**= highly significant

Table 4 Association between Vaccination Failures and how Vaccines are administered among Poultry Farmers in Wukari

Vaccines(n=45) How vaccines are administered Vaccination failure chi-square p-value
Marek's vaccines Yes / (%) No/(%)
Self admin 3 (12.0) 0 (0) 4.325 0.025* F
Vet admin 4 (16.0) 1 (5.0)
Not sure 18 (72.0) 19 (95.0)
Newcastle intraocular
Self admin 14(56.0) 5 (5.0) 22.858 0.000** F
Vet admin 9 (36.0) 4 (20.0)
Not sure 2 (8.0) 15 (75.0)
Newcastle lasota
Self admin 14(56.0) 2 (10) 16.577 0.000** F
Vet admin 5 (20.0) 1 (5.0)
Not sure 6 (24.0) 17 (85.0)
Newcastle komorov
Self admin 10 (40) 0 (0) 11.647 0 .000** F
Vet admin 1 (4) 0 (0)
Not sure 14 (56.0) 20 (100)
Gumboro
Self admin 17 (69.0) 2 (10) 27.641 0.000** F
Vet admin 7 (28.0) 2 (10)
Not sure 1 (4.0) 16 (80)
Fowl-cholera
Self admin 9 (36.0) 0 (0) 9.026 0.000** F
Vet admin 1 (5.0) 1 (4.0)
Not sure 15 (60.0) 19 (95.0)
Fowl- Typhoid
Self admin 8 (32.0) 0 (0) 9.317 0.001** F
Vet admin 3 (12.0) 1 (5.0)
Not sure 14 (56.0) 19 (95.0)
Fowl-pox
Self admin 14 (56.0) 0 (0) 28.106 0.000** F
Vet admin 8 (32.0) 2 (10.0)
Not sure 3 (12.0) 18 (90.0)
Coccidiosis
Self admin 8 (32.0) 0 (0) 9.028 0.001* F
Vet admin 4 (16.0) 2 (10.0)
Not sure 13 (52.0) 18 (90.0)
Egg Drop syndrome
Self admin 3 (12.0) 0 (0) 4.500 0.001* F
Vet admin 2 (8.0) 0 (0)
Not sure 20 (80.0) 20 (100)

Key
F= fisher's exact test
*= significant difference
**= highly significant

Table 5 Association between use of Vaccines and Record of Vaccination among Poultry Farmers in Wukari

Used of Vaccines(n=45) Vaccination record chi-square p-values
Marek's vaccines Yes (%) No (%)
Yes 5 (62.5) 3 (37.5) 1.640 0.200 F
No 14 (37.8) 23 (62.2)
Newcastle intraoculars
Yes 16 (59.3) 11 (40.7) 8.031 0 .005* F
No 3 (16.7) 15 (83.3)
Newcastle Lasota
Yes 15 (62.5) 9 (37.5) 8.668 0.003* F
No 4 (19.0) 17 (81.0)
Newcastle komorov
Yes 9 (75.0) 3 (25.0) 7.207 0.007* F

No 10 (30.3) 23 (69.7)					
Gumboro					
Yes 2 (11.8)	11 (39.3)	10.389	0.001*	F	
No 17 (60.7)	15(89.2)				
Fowl-cholera					
Yes 8 (66.7)	4 (33.3)	4.207	0.045*	F	
No 11 (33.3)	22 (66.7)				
Fowl-Typhoid					
Yes 9 (75.0)	3 (25.0)	7.207	0.007*	F	
No 10 (30.3)	23 (66.7)				
Fowl pox					
Yes 16 (59.3)	11 (40.7)	8.031	0.005*	F	
No 3 (16.7)	15 (83.3)				
Coccidiosis					
Yes 11 (61.1)	7 (38.9)	4.388	0	.036*	F
No 8 (29.6)	19 (70.4)				
Egg drop syndrome					
Yes 4 (80.0)	1 (20.0)	3.291	0	.070	F
No 15 (37.5)	25 (62.5)				

F= fisher's exact test
*= significant difference
**= highly significant

Table 6 Association between how Vaccines are kept and Vaccination Failure among Poultry Farmers in Wukari

How Vaccines are kept (n=45)	Vaccination failure	chi-square	p-val	
Yes/(%)	No /(%)			
Refrigerated 14 (89.5)	2 (10.5)	15.485	.000*	F
No refrigerated 3 (100)	0 (0)			
I don't kept 8 (30.8)	18 (69.2)			

Key
F= Fisher's exact test
*= significant difference
**= highly significant

4. Discussion

The demographic characteristics of poultry farmers in the study area showed that 57.8% of the respondents were males and 42.2% females. This is in agreement with Adisa and Akinwunmi [9] who found out that The findings show that most of the farmers were the youthful, 18-20 years (53.3%). This agree with the findings of Akintunde and Adeoti, [10] which reported that the age population of poultry framers were at their youthful age (that most poultry farmers requires rigorous effort which suite the youths. Most of the people engaged in poultry farming (68.9%) were at tertiary level of education.

The association between use of Intraocular Newcastle Disease Vaccine and purpose of keeping birds was statistically significant ($p<0.05$). The low vaccination rate of domestically kept birds in comparison to commercially raised birds using Intraocular Newcastle Disease Vaccine is a basis for Newcastle disease being endemic in the study area [11,12].

The association between diseaseoutbreak and use of vaccine reveals significance difference at ($p<0.05$) in the use of Gumboro Vaccine, Fowltyphoid Vaccine, Fowlpox Vaccine and Coccidiosis Vaccines and Egg Drop Syndrome within the study area. From the findings in this study it is seen that there was still reported outbreak of some poultry diseases even though they were vaccinated against [13,14,15,16,17]. This can be attributed to vaccine failure or poor quality vaccines used in the control of these poultry diseases within the study area [18,19,20]. The finding of this research agrees with the work of Akintunde and Adeoti, [10]which reported that disease outbreak constitute major constraint to poultry production in Nigeria.

From the outcome of this studies it can be inferred that the common cause of vaccine failure is vaccines handling and mode of administration of the vaccines. This finding agrees with the study done by Bosha J.A, and Nongo N.N [21], which reported a recurrent phenomenon in the tropics were prevalent breaches in the recommended practices of vaccine handling and administration such as purchase, packaging of sub vial fragments, improper preservation: lack of cold chain maintenance during transportation and storage, improper management of stress before, during and after vaccination and general lack of adherence to manufacturer's instructions are found [22,23]. In addition, Butcher and Yegani [24] reported that vaccines handling, administration and management practices are among reasons for vaccination failures.

CONCLUSION

In conclusion Newcastle disease vaccines are mostly used poultry vaccine in Wukari. Vaccines administration, vaccination record and vaccine storage are among practices that limit vaccine profitability to poultry farmers inWukari Local Government Area. There is need for public awareness on proper vaccination programs also further research is required on vaccination and immunity monitoring for vaccine effectiveness.

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